

**What is Claimed is:**

- 1           1. A digital spread spectrum frequency synthesizer, comprising:  
2           a divider for receiving a reference clock with a substantially fixed period and  
3           generating an output clock with a time-varying period;  
4           a noise-shaped quantizer for quantizing a period control word to a time-varying  
5           value in response to said output clock fed from said divider so that said divider  
6           generates said output clock by means of dividing said reference clock by said  
7           time-varying value;  
8           means for adjusting said period control word by a period offset in response to  
9           said output clock; and  
10          a filter for substantially filtering out jitter from said output clock.
- 1           2. The digital spread spectrum frequency synthesizer as claimed in claim 1,  
2           wherein said period control word has a bit resolution greater than that of said  
3           time-varying value.
- 1           3. The digital spread spectrum frequency synthesizer as claimed in claim 1,  
2           wherein said noise-shaped quantizer is a delta-sigma quantizer.
- 1           4. The digital spread spectrum frequency synthesizer as claimed in claim 1,  
2           wherein said filter is an analog phase locked loop (PLL) device as a low pass filter for  
3           removing high frequency jitter from said output clock.
- 1           5. The digital spread spectrum frequency synthesizer as claimed in claim 1,  
2           wherein said means for adjusting said period control word comprises:

3 an offset generator for generating said period offset in response to said output  
4 clock; and  
5 an adder for generating said adjusted period control word by means of adding  
6 said period offset to said a period nominal.

1 6. The digital spread spectrum frequency synthesizer as claimed in claim 5,  
2 wherein said offset generator is an up/down counter.

1 7. A digital spread spectrum frequency synthesizer, comprising:  
2 a noise-shaped quantizer for quantizing a period control word to a time-varying  
3 value;  
4 a divider for generating an output signal by means of dividing a reference signal  
5 by said time-varying value, said output signal feeding back to said noise-shaped  
6 quantizer so that said noise-shaped quantizer generates said time-varying value in  
7 response to said feedback output signal; and  
8 means for adjusting said period control word by a period offset in response to  
9 said output clock.

1 8. The digital spread spectrum frequency synthesizer as claimed in claim 7,  
2 further comprising a filter for of significantly filtering out jitter from said output  
3 signal.

1 9. The digital spread spectrum frequency synthesizer as claimed in claim 7,  
2 wherein said filter is an analog phase locked loop (PLL) device as a low pass filter for  
3 removing high frequency jitter from said output signal.

1           10. The digital spread spectrum frequency synthesizer as claimed in claim 7,  
2           wherein said reference signal is a reference clock with a substantially fixed period.

1           11. The digital spread spectrum frequency synthesizer as claimed in claim 7,  
2           wherein said output signal is an output clock with a time-varying period and a  
3           substantially precise long-term average frequency.

1           12. The digital spread spectrum frequency synthesizer as claimed in claim 7,  
2           wherein said period control word has a bit resolution greater than that of said  
3           time-varying value.

1           13. The digital spread spectrum frequency synthesizer as claimed in claim 7,  
2           wherein said noise-shaped quantizer is a delta-sigma quantizer.

1           14. The digital spread spectrum frequency synthesizer as claimed in claim 7,  
2           wherein said means for adjusting said period control word comprises:  
3           an offset generator for generating said period offset in response to said output  
4           clock; and  
5           an adder for generating said adjusted period control word by means of adding  
6           said period offset to said a period nominal.

1           15. The digital spread spectrum frequency synthesizer as claimed in claim 14  
2           wherein said offset generator is an up/down counter.